



US009180222B2

(12) **United States Patent**  
**Kausch et al.**

(10) **Patent No.:** **US 9,180,222 B2**  
(45) **Date of Patent:** **\*Nov. 10, 2015**

(54) **POLYMERIC TISSUE SEALANT**

FOREIGN PATENT DOCUMENTS

(71) Applicant: **Kuros Biosurgery AG**, Zurich (CH)

CA 2281602 8/1998  
EP 1 348 045 3/1974

(72) Inventors: **Annemie Rehor Kausch**, Winterthur (CH); **Simona Cerritelli**, Zurich (CH)

(Continued)

(73) Assignee: **Kuros Biosurgery AG**, Zurich (CH)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/598,786**

(22) Filed: **Jan. 16, 2015**

(65) **Prior Publication Data**

US 2015/0133579 A1 May 14, 2015

**Related U.S. Application Data**

(63) Continuation of application No. 12/102,157, filed on Apr. 14, 2008, now Pat. No. 8,961,947.

(60) Provisional application No. 60/911,737, filed on Apr. 13, 2007.

(51) **Int. Cl.**

**A61K 31/74** (2006.01)

**A61L 24/04** (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC ..... **A61L 24/046** (2013.01); **A61L 24/0042** (2013.01); **A61L 31/06** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC ..... **A61K 47/34**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,908,039 A 9/1975 Guthrie et al.

4,008,341 A 2/1977 Kehr

(Continued)

*Primary Examiner* — Paul Dickinson

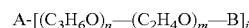
(74) *Attorney, Agent, or Firm* — Pabst Patent Group LLP

(57) **ABSTRACT**

Methods for making biomaterials for use as a tissue sealant, kits containing precursors for forming the biomaterials, and the resulting biomaterials are described herein. The biomaterials are formed from a composition comprising at least a first and a second precursor molecule, wherein:

i) the first precursor molecule is a poly(ethylene glycol) based polymer having x nucleophilic groups selected from the group consisting of thiol or amino groups, wherein x is greater than or equal to 2

ii) the second precursor molecule is of the general formula:



wherein m and n are integers from 1 to 200

i is greater than 2

A is a branch point

B is a conjugated unsaturated group

The precursors are selected based on the desired properties of the biomaterial. Optionally, the biomaterials contain additives, such as thixotropic agents, radiopaque agents, or bioactive agents. In the preferred embodiment, the biomaterials are used to reduce, inhibit, or contain loss of a biological fluid or gas in a patient.

**20 Claims, 4 Drawing Sheets**

